IEEE Standards Interpretation for IEEE Std 1050™-1996 IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations

This is an interpretation of IEEE Std 1050-1996.

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Interpretation Request #1
Topic: Single-point grounding for cabinets that are widely separated **Relevant Clause:** 5.3.1.2

What are the safety hazards imposed with the use of an isolated ground rod for grounding the instrument ground of a cabinet that has it's chassis and UPS power source grounded separately to a common ground grid?

Interpretation Response #1
The caution that "the use of one or more isolated ground rods as the signal reference ground is a safety hazard and is not recommended" is not explicitly explained in IEEE Std 1050-1996 since it is well covered in the IEEE Green Book™ (IEEE Std 142™-1991) and the IEEE Emerald Book™ (IEEE Std 1100™-1996). It is also a basic requirement of the National Electric Code® (NEC®) that all grounds be tied together.

The most basic safety hazard is that the isolated ground reference does not have a direct connection back to the system source which could prevent protective devices from operating because of the high impedance that is introduced. Equipment damage from transients such as lightning is also a real concern.

See 5.3, 5.4, and 5.5 of the IEEE Green Book (IEEE Std 142-1991) and 8.5.3.2, 10.5.5, and 10.8 of the IEEE Emerald Book (IEEE Std 1100-1999) for some good examples.

When cabinets are widely separated, problems can occur not just from the signal refer-

ence system, but also from the power system. Supplying all cabinets from a common uninterrupted power supply (UPS) with relatively long circuit runs is not recommended by a some vendors based on actual field problems. It is becoming common to recommend separately derived power systems (dedicated UPS or isolation transformer) within 50 feet of each group of cabinets.